

## SPECIFICATION

To All Whom It May Concern:

Be It Known That We , Steven M. Shei, a citizen of the United States and a resident of the County of Allen, State of Indiana, whose post office address is 11334 Branstrator Road, Fort Wayne, Indiana 46809, and Clement J. Luebke, a citizen of the United States and a resident of the County of St. Louis, State of Missouri, whose post office address is 7464 Woodlawn Colonial Lane, St. Louis, Missouri 63119, have invented new and useful improvements in

**MERCHANDISER FOR WARM AND COLD FOODS**

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## CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable.

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

## BACKGROUND OF THE INVENTION

This invention relates in general to the storage and presentation of foods, and more particularly a merchandiser for displaying warm and cold foods.

Traditional restaurants use menus to inform patrons of the foods which are available for consumption on the premises of such restaurants. Cafeterias, on the other hand, actually display the foods for the patrons to observe and select. While cafeteria displays may stimulate sales, cafeteria lines are not for all restaurants. Not only do they occupy considerable space, but they often detract from the ambiance that a restaurateur may seek to present. Yet the actual display of foods stimulates the sale of such foods, and this holds particularly true for pies, salads and confections – foods which might not otherwise be purchased with traditional meal orders.

Merchandisers in the form of cabinets exist for displaying one type of food or another, but rarely different types of foods. One never finds warm and cold foods displayed together, obviously by reason of the different temperatures at which they must be held.

## SUMMARY OF THE INVENTION

The present invention resides a merchandiser that has a cold compartment and a warm compartment, with the latter being supported on side walls where it is elevated above the cold compartment. The warm compartment is enclosed and is heated by a heating unit located within it.

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## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

In the accompanying drawings which form part of the specification and wherein like numerals and letters refer to like parts wherever they occur -

Fig. 1 is a perspective view of a merchandiser constructed in accordance with and embodying the present invention, with the merchandiser being installed in a counter;

Fig. 2 is another perspective view of the merchandiser elevated from the counter in which it is normally mounted; but with its wire shelf and racks removed;

Fig. 3 is a sectional view taken along line 3-3 of Fig. 2;

Fig. 4 is a sectional view taken along line 4-4 of Fig. 2;

Fig. 5 is an exploded perspective view of the housing that closes the upper compartment for the merchandiser and of the heating unit that is within the housing; and

Fig. 6 is an exploded perspective view of the shelf that closes the bottom of the upper compartment.

## DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, a merchandiser A (Figs. 1 and 2) contains an upper or warm compartment 2 which holds warm foods and a lower or cold compartment 4 which holds cold foods. Both compartments 2 and 4 are fully visible from the front and sides of the merchandiser A as are the foods that are within them. Thus, the compartments 2 and 4 display the foods, and the display is enhanced with illumination from within the merchandiser A. Moreover, each compartment 2 and 4 is fully accessible from the exterior of the merchandiser A so that individuals at the merchandiser A may withdraw foods that are displayed within the two compartments 2 and 4. Actually, the merchandiser A rests on a counter B having a top 6

provided with a cutout 8. A portion of the merchandiser A is recessed into the countertop 6 at the cutout 8, while the remainder of it rises above the top 6.

The merchandiser A includes (Figs. 1 and 2) a cold pan 12 which fits into the cutout 8 in the countertop 6, and a closure assembly 14 which rises upwardly from the cold pan 12 and encloses the upper compartment 2, spacing it from the lower compartment 4. In addition, the merchandiser A has a heating unit 18 (Figs. 5) which is supported in the closure assembly 14 along the upper region of the upper compartment 2. It draws air from the upper compartment 2, heats that air, and then recirculates the heated air through the compartment 2. Finally, the merchandiser A has a refrigeration unit 20 which is located within the counter B where it is attached to and supported on the cold pan 12. The refrigerator unit 20 cools the cold pan 12 and maintains the lower compartment 4 at a temperature less than ambient.

The cold pan 12 fits into the cutout 8 in the top 6 of the counter B and lies within the counter B. It includes (Figs. 3 and 4) spaced apart front and back walls 24 and 26 which are vertical, side walls 28 which join the ends of the front and back walls 24 and 26 and are likewise vertical, and a bottom wall 30 which is joined to the lower margins of the front and back walls 24 and 26 and to the lower margins of the side walls 28. The walls 24, 26, 28 surround the lower compartment 4, while the bottom wall 30 closes the bottom of the compartment 4. The top of the lower compartment 4 is open, so that the compartment 4 opens upwardly into the closure assembly 14. Actually, each of the walls 24, 26, 28 and 30 consists of inner and outer panels 32 and 34 which are spaced about 1.0 inches apart and a thermal insulation 36 that is located between the panels 32 and 34. The inner panels 32 for each of the walls 24, 26, 28 and 30 are joined as are the outer panels 34, so the joined together inner panels 32 form a liner, while the joined outer panels 34 form an exterior shell. The insulation 36 is preferably polyurethane which

is formed in place. The bottom wall 30 contains a drain 38 through which water may be released from the cold pan 12. Finally, the cold pan 12 has a flange 40 to which the upper margins for the inner and outer panels 32 and 34, for the front and back walls 24 and 26 and for the side walls 28 are attached. The flange 40 overlies the top 6 of the counter B immediately around the cutout 8.

The cold pan 12 contains a shelf 42 (Fig. 3), in the form of a wire grid which rests on angle brackets 44 that are secured to the inner panels 32 of the side walls 28. The shelf 42 lies along the front wall 24, from which it is inclined rearwardly and upwardly to the mid-region of the pan 12. The bottom wall 30 supports racks 46, likewise in the form of wire grids, and they separate the foods that are placed on it from the cold inner panel 32 of the bottom wall 30. The flange 40 along the front wall 24 has a menu bar 48 attached to it for presenting cards which display prices and other information at a convenient angle for viewing by one standing in front of the merchandiser A.

The closure assembly 14 rests on the cold pan 12 from which it projects upwardly, it being the portion of the merchandiser A which is exposed above the top 6 of the counter B. The closure assembly 14 includes (Figs. 2 and 4) side walls 50 which are attached to the segments of the flange 40 that overlie from the side walls 28, and bottom wall 30 of the cold pan 12. The side walls 50 rise upwardly from these segments. Each includes a side panel 52 which is preferably formed from a sturdy transparent material, such as plastic or glass. The panel 52 at its lower end is about as wide as the cold pan 12, but its front and rear edges slope and converge toward a horizontal top edge, the front edge being at a greater inclination than the rear edge. The front edge merges with the top edge along a generally arcuate edge. In addition, each side wall 50 has a tubular post 54 which extends upwardly along the outside face of the panel 52, with its rearwardly presented face being along the slightly inclined rear edge of the panel 52. The post

54, which is fastened firmly to the flange 40 of the cold pan 12 and also to the panel 52, extends from the flange 40 to near the horizontal top edge of the panel 52. At its upper end, the post 54 is fitted with a hinge bracket 56 which extends forwardly along the outside face of the panel 52, its upper margin being flush with the horizontal upper edge of the panel 52. Intermediate its ends the end post 54 is fitted with another hinge bracket 58 which projects inwardly across the rear edge of the adjacent panel 52. The posts 54 rigidify the panels 52 and further serve as a conduit for the electrical wiring that leads to the heating unit 18. Apart from that, each post 54 carries a thin fluorescent lamp 60 which extends along its forwardly presented face and of course along the outside face of the adjacent panel 52 as well. The lamp 60 illuminates the two compartments 2 and 4 of the merchandiser A. Each lamp 60 is enclosed in a lamp shield 62 that is attached to the post 54 along which the lamp 60 extends, with the attachment being such that the shield 62 may be removed to replace the lamp 60.

The closure assembly 14 also includes a housing 64 (Figs. 2 and 5) and a shelf 66, both of which extend between the two side walls 50, the former above the latter. The housing 64 includes a main panel 68 in the form of an inverted channel and end caps 69 which close the ends of the inverted channel. The end caps 69 are attached to the hinge brackets 56 that are on the upper ends of the posts 54 for the two side walls 50. The top of the panel 68 is generally planar and lies flush with upper edges of the panels 52 for the side walls 50. But the main panel 68 along its front contains a recess 70 (Fig. 5) which is somewhat depressed from the upper edge of the panel 52. It opens both upwardly and forwardly, taking the form of a rabbet.

In addition, the housing 64 includes a motor panel 72 that fits within the main panel 68 and an intake panel 74 which is attached to the main panel 68 and closes the bottom of the inverted channel formed by the main panel 68. The intake panel 74 for the most part is

horizontal and within its horizontal region it contains a circular intake opening 76 which is located midway between its ends and discharge slots 78 which are located beyond the intake opening 76 on both sides of the opening 76. But the panel 74 has a beveled segment 80 (Figs. 3 and 4) which is presented forwardly and contains more discharge slots 78 (Fig. 4). Preferably, all three panels 68, 72 and 74 of the housing 64 are formed from metal sheet, such as stainless steel, that will resist corrosion. Finally, the housing 64 contains a thermal insulation 82 which rests on the motor panel 72, yet is separated from the top of the main panel 68.

Whereas, the housing 64 closes the top of the upper compartment 2, the shelf 66 closes the bottom of the compartment 2. It rests on cross rails 84 (Fig. 3) that extend between the two side walls 50. Actually, the ends of the rails 84 are attached firmly to the panels 52 of the side walls 50 with machine screws which pass through the panels 52 and thread into the ends of the rails 84. Not only do the rails 84 support the shelf 66, but they also rigidify the closure assembly 14.

The shelf 66 includes a top panel 86, a bottom panel 88 and thermal insulation 90 located between the two panels 86 and 88. The top panel 86 is turned downwardly along edges in the form of flanges 92, and the flanges 92 at the ends of the panel 86 contain arcuate notches 94 which open downwardly and receive the cross rails 84, thereby positioning the shelf <sup>66</sup>~~16~~ on the rails 84 so that it does not slide forwardly or rearwardly. The lower panel 88 fits within the flanges 92 of the top panel 86 and the insulation 90 is captured between the two panels 86 and 88. The main panel 86 of the shelf 66 supports a wire rack 96 which elevates foods slightly off the shelf 66 and thereby allows warm air to circulate under the foods.

The shelf 66 may also be formed in a single piece from a polymer, either in an injection molding procedure or a vacuum forming procedure. The polymer serves as thermal insulation,

eliminating the need for the separate insulation 90. In addition, the closure assembly 14 has (Fig. 3) a front door 100 and a rear door 102, both of which, when closed, isolate the upper compartment 2, but when open afford access to the compartment 2. Both doors 100 and 102 are formed from a transparent material such as plastic or glass. When the front door 100 is closed, its upper end lies within the recess 70 of the main panel 68 for the housing 64, so that its exterior surface is flush with the adjoining top surface of the main panel 68 and forms a continuation of that surface. From there, the front door 70 curves downwardly, following the contour of curved edges on side panels 52, although lying inwardly from the panels 52. Beyond the curvature the door 100 continues downwardly following the straight, but inclined, front edges of the side panels 52. It terminates at the shelf 66. At its upper end, the front door 100 has hinge brackets 104 (Fig. 2) which are connected to the hinge brackets 56 on the posts 54 by pivot pins which form a pivot axis that extends behind the recess 70. Along its bottom edge the front door 100 has a handle 108. When one grasps the handle 108 and lifts, the door <sup>100</sup>~~76~~ swings upwardly about the axis of the pivot pins and exposes the upper compartment 2. In the alternative the front door 100 may descend past the shelf 66 to the flange 40 on the cold pan 12 and be secured, so that the compartments 2 and 4 are accessible only from the rear of the closure assembly 14.

The rear door 102 is flat and, when closed, lies between the two side panels 52 at the slightly inclined rear edges of those panels 52 (Fig. 3). It closes the area between the housing 64 on the top and the shelf 16 on the bottom. At its lower end the rear door 102 has hinge brackets 110 (Fig. 2) which are connected to the hinge brackets 58 on the posts 54 through pivot pins which establish a pivot axis that runs along the rear edge of the shelf 66. Along its upper edge the rear door 102 has a handle 112. Normally, the rear door 102 lies between the side panels 52 at the inclined rear edges of those panels 52 with its upper end resting against the main panel 68



of the housing 66. When one grasps the handle <sup>112</sup>80 and pulls, the rear door 72 swings outwardly and downwardly and exposes the upper compartment 2.

The main panel 68 and the intake panel 74 enclose a plenum 116 (Figs. 3 and 4) within the housing 64, and the plenum 116 contains the heating unit 18. The heating unit 18 includes (Fig. 5) a fan motor 120 which rests on the motor panel 72 to which it is secured. The motor 120 rotates an upper fan 121, which is located in the space between the top of the main panel 86 and the insulation 90, and a lower fan 122, which is located beneath the motor panel 72 and immediately behind the circular intake opening 76 in the intake panel 74. The motor 120 also has a heat sink 123 projecting laterally from it into the space between the top of the main panel 86 and the insulation 90. The upper fan 121 circulates air in this space, and that air passes over the heat sink 123 to dissipate heat from the heat sink 123 and motor 120. The lower fan 122 draws air from the upper compartment 2 through the opening 76 into the plenum 116 where the air is directed laterally through the plenum 116 to be discharged through the slots 78 back into the upper compartment 2. As the air moves laterally through the plenum 116 it passes over a heating element 124 of the electrical resistance type which is attached to the motor panel 72 on each side of the fan motor 120.

The motor panel 72 also carries a temperature sensor 126 (Fig. 4) which is located next to the fan 122 so that the air discharged by the fan 122 passes over the sensor 126 before encountering the nearby heating element 124. In effect, the sensor 126 measures the temperature of the air within the upper compartment 2. The panel 72 also carries a high limit sensor 127 which will effect an interruption of the electrical circuit to the heating element 124 when the temperature of the panel 72 and the air around it exceeds a prescribed maximum. Finally, the heating unit 18 contains a control 128 (Fig. 2) for setting the temperature at which the heating

unit <sup>12</sup>78 maintains the temperature of the air within the upper compartment 2, and the control 128 is accessible at the back of the housing 64.

The refrigeration unit 20 includes (Fig. 4) a compressor 130 and a condenser 132, both of which are located below the cold pan 12 on a frame 134 that is suspended from the cold pan 12.

In addition, the refrigeration unit 20 has <sup>a refrigerant conduit in the form of</sup> an evaporator coil 136 (Figs. 3 & 4) which extends in a serpentine configuration along the inner panels 32 for the front wall 24, back wall 26, side walls 28 of the cold pan 12. The insulation 36 lies behind the evaporator coil 136 so the inner panels 32 of the walls 24, 26 28 and 30 exist at a temperature considerably less than the outer panels 34. The compressor 130 of course, compresses a refrigerant while it is in a gaseous state, and thus elevates the temperature of the refrigerant. While at an elevated temperature, the refrigerant enters the condenser 132 where it transforms into a liquid, losing heat as it does. The high pressure liquid passes through an expansion valve where it expands and reverts to a gaseous state. The gaseous refrigerant, having expanded, exists at a temperature less than ambient. The low temperature refrigerant flows through the evaporator or coil 136 and extracts heat from the cold pan 12, thus reducing the temperature of the lower compartment 4 below ambient.

In use, the merchandiser A rests on the counter B with its upper compartment 2 elevated somewhat above the countertop 6 and its lower compartment 4 recessed into the counter B. The heating unit 18 elevates the temperature of the upper compartment 2, with the heat being supplied by the heating elements 124 in the plenum 116 of the housing 64. The fan 122 continually circulates the heated air through the compartment 2. The refrigeration unit 20, on the other hand, maintains the temperature of the air within the lower compartment 4 below ambient temperature.

The restaurant, or other establishment in which the merchandiser A is used, displays both cold and hot foods in the merchandiser A. The cold foods are arranged on the shelf 42 within the cold pan 12 and racks 46 at the bottom of the cold pan 12 as well. Indeed, the racks 46 separate the foods at the bottom of the lower compartment 4 from the inner panel 32 of the bottom wall 30 and keep foods from freezing against that panel 32. Hot foods, on the other hand, are spread over the shelf 66 at the bottom of the upper compartment 2.

Typically, the foods on display in the merchandiser A are desserts and salads. Some, such as pies and pastries, are preferably served warm, while others, such as confections and salads, are usually served cold. Juices and water are also usually served cold. The patron may actually remove a selected food item from the merchandiser A or simply identify it and let an employee of the restaurant remove it. One simply reaches into the cold compartment 4 to remove a refrigerated food item from it, in that the cold compartment is unobstructed at its front and rear as well. To remove a warm food item from the upper compartment 2 one must lift the front door 100 which thereupon pivots upwardly at its hinge brackets 56 and 104. Restaurant employees resupply the lower compartment 4 by simply placing food items in it, usually from the rear. After all, the lower compartment 4 is exposed between the side walls 50 at both the front and rear of the merchandiser A. Restaurant employees resupply the upper compartment 2 with food items by lowering the rear door 72 which pivots downwardly at its hinge brackets 58 and 110. In any event, the upper compartment 2 is normally enclosed on its top by the housing 64, on its bottom by the shelf 66, on its sides by the panels 52 of the side walls 50, at its back by the rear door 102, and at its front by the front door 100, all of which in a broad sense constitute walls. However, by extending the front door 100 downwardly to the flange 40 of the cold pan 12 and securing it, access to both compartments 2 and 4 may be restricted to only employees. The

panels 52 and front door 100 are transparent and the compartment 2 is illuminated with the lamps 60, so that the heated foods within it are highly visible to one standing in front of the cabinet A and even to the sides of the cabinet A. The complete enclosure of the upper compartment 2 retains the heated air within that compartment 2, thus placing minimum demands on the heating unit 18.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

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